



Next Club Meeting Sunday 9th February Belviour Guides Hall 6 Silva Drive West Wodonga

Meetings commence with a BBQ (with a donation tin for meat) at 12pm with meeting afterwards
Members are encouraged to turn up a little earlier for clubroom maintenance
Call in Via VK3RWO, 146.975, 123 Hz tone



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New HF Dipole, then a Loop ~ Mick VK3CH

The previous inverted V used to work well but slowly lost efficiency, I thought it was band conditions until I could not even talk to stations just a few km away. Instead of trying to fix it, it was time for a whole new approach. The old antenna was a total length of about 17 meters of steel wire.

The new antenna is now running the full length of the depth of the quarter acre property. This depth distance is about 40 meters. Biggest change is from previously running east – west, the new run is now north to south. Propagation and radiation patterns will alter 90 degrees accordingly.

Because I did not know why the other antenna failed, I decided to use all new everything. A drum of thin LL400 coax was purchased with suitable PL259 connectors and a 150 foot roll of twisted copper antenna wire and some insulators. The existing bamboo poles were relocated along the fence line.

A few trees of ours and next door were in the way of the proposed wire run, so some savage pruning was carried out. I don't do much gardening, but in the spirit of ham radio I got right into it. The pile of pruned branches filled 2 large garden bins. The first day was spent cutting a path through some trees for the wire and positioning the bamboo poles. Next day was spent running the copper wire and running the new coax under the house.

From the radios in the shack a run of 15 meters of coax come to a fishing reel where about 5 meters of the coax are wound to form a choke to stop any RF coming back down the coax into the radios. The coax end then feeds into a 4:1 balun into balanced 450 ohm ladder line. The ladder line is soldered onto the copper wire to ensure a valid electrical connection that will last over time.

Total run of wire is now 39 meters, giving 19.5 meters in each leg. I could have gone two meters more but I wanted to stay away from the neighbour's tree near the front and also did not want the end of the wire too close to the footpath at the front of the property.

Testing of the antenna using an ATU gave the results seen in the chart – every band except 160 meters, but on 160 meters lots of amateur AM stations are heard during the day.

THE ORIGINAL DIPOLE BEFORE EXTRAS

Band	VSWR
1.8 MHz 160 meters	Not Tune
3.5 MHz 80 meters	Tunes All VSWR <1:1.1
7 MHz 40 meters	Tunes All VSWR <1:1.1
10 MHz 30 meters	Tunes All VSWR <1:1.1
14 MHz 20 meters	Tunes All VSWR <1:1.1
18 MHz 17 meters	Tunes All VSWR <1:1.1
21 MHz 15 meters	Tunes All VSWR <1:1.1
24 MHz 12 meters	Tunes All VSWR <1:1.1
28 MHz 10 meters	Tunes All VSWR <1:1.1
50 MHz 6 meters	Tunes All VSWR <1:1.1

The centre feed on a pulley so it can be lowered for maintenance



Listening on the NEVARC Net had most stations good copy but the new radiation pattern did not favour Wodonga so much. Adelaide and Tasmania stations boomed on 30+
A few days are needed to discover the new reception as 40 meters changes on a daily basis, maybe it was just band conditions.

4:1 Balun under the carport roof



Ladder line from Balun to top of centre pole



Centre Feed



The ladder line is deliberately twisted to stop the wind flapping it about.
It is spaced away from the guttering to stop any unwanted effects.
The centre pole is 5 meters high. The closest the wire gets to any vegetation is about half a meter with most of the run in the clear.



The noise floor during the day, on 40 meters is S3 to S4 with the preamp on, that's not too bad for a suburban city location.

ADDITIONS TO DIPOLE – SOUTHERN END

I decided to try extending one end of the dipole along the back fence another 17.7 meter run of wire. This made the southern dipole end an “L” shape. After attaching the wire I found a few tree branches were in its way. More tree surgery got rid of these. They were very high but I attached a saw to the end of one of my 5 meter bamboo poles and used the saw to reach them. I have pulleys on each pole to be able to lower and raise the wire ends for adjustments and maintenance. After raising the new extra wire in the air it was back to the radio for more tests.

This time the radio was able to match all bands with all of 160 meters perfectly tunned as well to each edge of the band. Every band was tuned to a VSWR <1:1.1 typically, regardless of band including all of the new WARC bands. A few days later on the NEVARC Net had most stations very good copy especially Ron VK3AHR and Brenton VK3CM.

Southern end of extra wire added to dipole

Middle Short Pole

All connections are soldered



ADDITIONS TO DIPOLE – NORTHERN END

As the extra wire improved things, I decided to add an extra length to the northern end as well. This would make it a centre fed “C” pattern antenna.

As there are all the cables for house power, the old telephone pair and the new NBN cables the new wire was placed underneath. The short bamboo pole was swapped to the other side of the front lawn, with a new 5 meter bamboo pole on the fence so the wire was quite high over the driveway. This was done in case I ever place a high vertical whip on the car and forget about it when I park in the drive and possibly bring down the wire I have just put up.

Back to the shack and testing has all bands still matched with VSWR <1:1.1 typically, including 160 meters still matched also. My “choke” of coax on the reel still kept any signals coming back to the radio despite three sides of the house now surrounded with my HF extended dipole wire.

New higher bamboo pole, northern end of the dipole



View to the extra run of cable, RED square shows the pole



Band	Background Noise Floor DAY	Background Noise Floor NIGHT
1.8 MHz 160 meters	S 6	S 4
3.5 MHz 80 meters	S 4	S 2
7 MHz 40 meters	S 4	S 2
10 MHz 30 meters	S 7	S 4
14 MHz 20 meters	S 1	S 1
18 MHz 17 meters	S 1	S 1
21 MHz 15 meters	S 2	S 1
24 MHz 12 meters	S 2	S 1
28 MHz 10 meters	S 0	S 0
50 MHz 6 meters	S 0	S 0

A WORD ON 160 METERS ON A DIPOLE

Horizontal dipoles for 160 make the same common, mutually-derived glaring error.

They equate low SWR with good radiation.

They think that just by lengthening an 80 metre dipole it should work.

They fail to take into account that a 160 metre dipole, typically 30 feet above the ground, is only 1/16th wavelength above earth. Effectively, at that frequency, a 30-foot elevated dipole is lying on the ground!

Doesn't matter how well matched it is, whatever it radiates will either be absorbed in the ground, or be sent straight up through the ionosphere at an angle too high for total internal reflection to ever bring it back down to earth.

As ground waves (the predominating propagation mode below 3 MHz) are inherently vertically polarised.

The only thing a horizontal dipole can hope to radiate is sky wave.

On 160 metres it will do that very poorly, and whatever ground waves leak out of the system will constructively and destructively interfere with the sky wave to cause gross fading and multipath distortion.

It might work weakly at night, but during the day on 160 when only ground waves are propagating, it will hardly work at all.

If horizontal dipoles were any good at medium frequencies, AM broadcast stations would use them. They never have.

All AM broadcast stations use vertical radiators, and most broadcast stations use 5/8 wavelength vertical radiators against a good, extensive earth mat.

Even to get horizontals 1/4 wave above ground on that band, to propagate sky waves only, the whole dipole would have to be elevated to 40 metres = 131 feet above ground before the majority of its radiation would either be absorbed in the ground (also loaded heavily by it) or radiated straight up.

The predominant propagation mode on 160 is via ground waves. Ground waves are inherently vertically polarised.

You will need a good earth mat, ground radials, or a good counterpoise to begin with.

The best you can do on that band is an inverted "L" against ground (which is effectively a top-loaded vertical), either 40 metres in total length, or shorter but with inductive loading at the top of the vertical section.

Or you can run a shortened vertical with inductive loading between the vertical section and a capacity hat of some description.

To make that 160 metre dipole radiate excellently, you can do one very simple thing.

Tie the feeders together, or short the coax, and run it as a "T" antenna against ground via a good antenna tuner.

The feedline, the vertical, then becomes the radiator and the horizontal dipole becomes the capacity hat.

My experiments with trying to work stations on 160 meters with my new dipole appear to back up all the theory – that is, I cannot work many stations and only ones close by, about 15km or less in location from me.

I used to have a top loaded vertical but alas it got damaged while moving house. So I will have to make another one.

Finding room to put it up will be a challenge, as I want it ground mounted.

Perhaps a collapsible mast with a loading coil top hat that I can put out and pack up after use might be the answer.



Portable, years ago, on 160 meters, with a top loaded vertical at the park

ADDITIONS TO DIPOLE – LAST SIDE – MAKING IT INTO A LOOP

With curiosity getting the better of me, better performance was sought by making it into a loop a month later.

This should make it less directional.

A lot more QSO on HF will determine where it favours, but a loop is supposed to be more equal.

Things like guttering and trees will vary things on HF so you get what you're given.

But a loop running the edge of a quarter acre block ought to be good.

The total run of wire is 39 meters on east side, then 17.7 meters at the south, another 39 meters on the west side and 17.7 meters north. That's 113.4 meters total wire run, not many Melbourne suburban blocks get away with that, all within their own property boundary.



Trees each side of pole



No more trees each side of extended pole, they got used as Christmas trees, gifted away

Having the last wire run at a 5 meter height was big ask, so many tree branches to cut, both ours and the neighbours. But with EMR requirements the increased height was a must.

First thing was to run the wire to find out exactly what branches were in the way then make room accurately. Then a massive branch cutting marathon was taken out.

As a loop increases radiation, it was increased in height again and the front wire was run over the top of the incoming powerlines and NBN cables. The centre bamboo pole on the side was put to the front of the house to get the extra height. The new wire now sags the full length but as it is higher it is still in the clear.

The centre way of the new wire is supported by an insulator half way, tied off to the side of the house roof.

THE FINAL RESULTS WITH THE LOOP

Its early days, but it seems to have a more equal directional pattern. All bands tune up except 160 meters.

80 meters and 40 meters have stations heard very well with some noise but not too bad. The noise floor seems the same.

Other future tricks are to try are altering the length and run of the ladder line. Finding where I have put some will be the next task.

I only had some hook up wire left for the last run, so later I bought more hard drawn copper wire for the last 39 westerly meter run.

Having all the wires on pulleys that can be lowered makes alterations or maintenance easy.

The hard drawn wire has a bit of weight so it sags a bit, especially in the summer heat. Back support stay ropes had to be added to the back of the bamboo poles to stop them bending, one snapped while running on wire due to too much tension.

Signals are understood without the need to use any fancy settings or digital processing.

Digital processing makes speech sound artificial to me, but my hearing range these days is questionable, so can't blame the radio.

Most stations heard on Ron's VK3AHR Net are improved with the loop.

We are currently headed towards a solar minimum, forecasted to arrive in 2019 as the Sun switches over from Solar Cycle 24 to Solar Cycle 25. The Sun goes through 11-year cycles, during which solar activity increases and ebbs in a somewhat predictable fashion. Tracking this activity goes all the way back to the start of the first solar cycle in 1755. Today, simple sketching and counting of sunspot numbers has given way to ground and space-based operations that monitor the Sun around the clock.

Scientists charged with predicting the Sun's activity for the next 11-year solar cycle say that it's likely to be weak, much like the current one. The current solar cycle, Cycle 24, is declining and predicted to reach solar minimum – the period when the Sun is least active – late in 2019 or 2020.

Solar Cycle 25 Prediction Panel experts said Solar Cycle 25 may have a slow start, but is anticipated to peak with solar maximum occurring between 2023 and 2026, and a sunspot range of 95 to 130. This is well below the average number of sunspots, which typically ranges from 140 to 220 sunspots per solar cycle.

The panel has high confidence that the coming cycle should break the trend of weakening solar activity seen over the past four cycles.

~Mick VK3CH

6 Meter Vertical Tests ~ Mick VK3CH

I used to have a 6 meter vertical at the old house but sold it, maybe a silly thing to do.

So I got another one from Strictly Ham, the Diamond CP-62.

It's a long thing at about 6.8 meters height, made up of two co-phased 5/8 wave sections.

Tuning is done by sliding the bottom mast section length, in 25mm increments in the final stage, but it paid off with a good match.

This took several attempts requiring lifting the mast down and back up again.

The paperwork claims a useable spot range of 1 MHz, so 0.5 MHz either side of your chosen frequency.

In actual use I obtained the full band, 50 MHz to 54 MHz, all with VSWR of 1:1.5 or better.

It goes together in an hour, very easy to assemble, but you need to do it all outside as you need lots of room, just don't drop any small screws on the lawn. I use a soup bowl to keep little bits safe.

Getting ready to install up

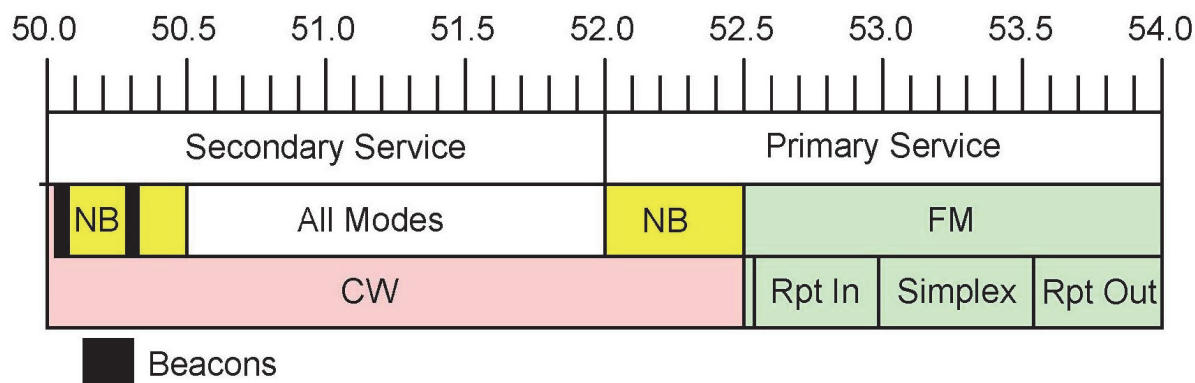


Adjusting the tune length with a ruler



I have the choice of using the dipole or the 6 meter vertical on 6 meter band.

Most of my QSO on 6 meters will either be chit chat on repeaters or simplex, between 52.500 MHz ~ 53.500 MHz





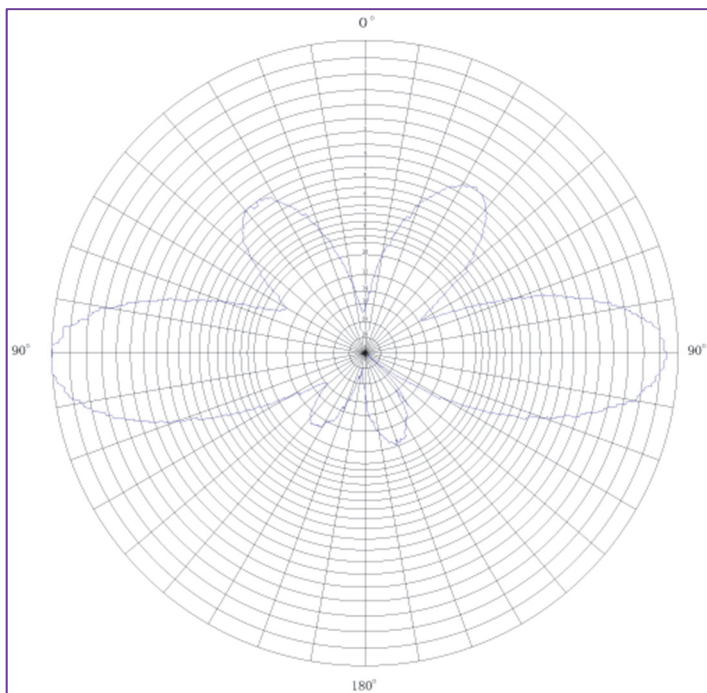
All finished and working well



No more climbing roofs, a mast at ground will do

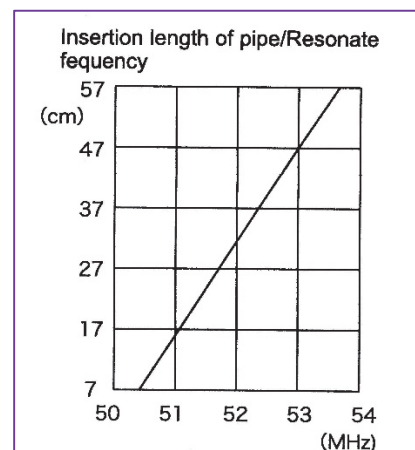
It is a good thing that the power to the house is aerial bundled cable, that is, it has an outer insulation on it. This makes erecting antennas that much safer as if you hit the power cables, you don't die.

The specs say Power 500 watts SSB, 200 watts FM. Gain 5.5 dB



CP62 Radiation Pattern - E-Plane

The radiation pattern is typical of a vertical. Of course with other metal objects and roofs and trees, it is never like the workshop tests. Switching between the dipole and the CP-62 has the repeaters fully quiet and 2 more S points with the CP-62.



The chart to determine tuning, a rough guide only

Time to rediscover the 'magic band', 6 meters

~Mick VK3CH

NEVARC Nets



40M Net

Monday, Wednesday and Fridays
10am Local time (East coast)

7.095 MHz LSB

Approximately + or - QRM

Hosted by Ron VK3 AHR

80M Net

Wednesday 20:30 Local time

3.622 MHz LSB

Hosted by Ron VK3 AHR

Using the club call VK3ANE

2M Nets

Monday at 2000 local time on
VK3RWO repeater

146.975 MHz

President, VK2VU, Gary
Vice President, Tom VK3NXT
Secretary, VK2FKLR, Kathleen
Treasurer, Amy



NEVARC CLUB PROFILE

History

The North East Victoria Amateur Radio Club (NEVARC) formed in 2014.
As of the 7th August 2014, Incorporated, Registered Incorporation number A0061589C.
NEVARC is an affiliated club of the Wireless Institute of Australia.

Meetings

Meetings details are on the club website, the Second Sunday of every month, check for latest scheduled details.
Meetings held at the Belviour Guides Hall, 6 Silva Drive West Wodonga.
Meetings commence with a BBQ (with a donation tin for meat) at 12pm with meeting afterwards.
Members are encouraged to turn up a little earlier for clubroom maintenance.
Call in Via VK3RWO, 146.975, 123 Hz tone.

VK3ANE NETS

HF

7.095 MHz Monday, Wednesday, Friday - 10am Local time
3.622 MHz Wednesday - 8.30pm Local time

VHF

VK3RWO Repeater 146.975 MHz – Monday - 8pm Local time
All nets are hosted by Ron Hanel VK3AHR using the club callsign VK3ANE

Benefits

To provide the opportunity for Amateur Radio Operators and Short Wave Listeners to enhance their hobby through interaction with other Amateur Radio Operators and Short Wave Listeners. Free technology and related presentations, sponsored construction activities, discounted (and sometimes free) equipment, network of likeminded radio and electronics enthusiasts. Excellent club facilities and environment, ample car parking.

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All editors' comments and other opinions in submitted articles may not always represent the opinions of the committee or the members of NEVARC, but published in spirit, to promote interest and active discussion on club activities and the promotion of Amateur Radio. Contributions to NEVARC News are always welcome from members.

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While we strive to be accurate, no responsibility taken for errors, omissions, or other perceived deficiencies, in respect of information contained in technical or other articles.

Any dates, times and locations given for upcoming events please check with a reliable source closer to the event.

This is particularly true for pre-planned outdoor activities affected by adverse weather etc.

The club website <http://nevarc.org.au> has current information on planned events and scheduled meeting dates.

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